

Claims:

- 1 1. A method for calibrating a gap measuring tool comprising:
2 providing a calibration standard including at least one mock slider to be in contact with a
3 mock disc, said slider including a recessed portion, said recessed portion being a slider surface
4 recessed with respect to a disc surface;
5 determining an actual distance between said disc and a surface of the recessed portion of
6 said slider at at least one location;
7 determining by optical measurement an observed distance between said disc and surface
8 of recessed portion of said slider at said at least one of said locations; and
9 comparing said observed distance to said actual distance at each of said locations.
- 1 2. The method of claim 1, further comprising calibrating said gap measuring tool based on
2 the differential between each measured distance and its associated actual distance.
- 1 3. The method of claim 1, further comprising:
2 determining a surface profile; and
3 compensating for surface irregularities based on said profile.
- 1 4. The method of claim 3, wherein said determining a surface profile is by a profilometer.
- 1 5. The method of claim 1, further comprising providing a mock slider having an inclined
2 surface, said inclined surface maintaining a space between said disc and said slider varying with
3 respect to position.

1 6. The method of claim 5, further comprising forming said recessed portion of said slider by
2 a chemical deposition process.

1 7. The method of claim 5, wherein said determining said actual distance is performed by an
2 atomic force microscope (AFM).

1 8. The method of claim 5, wherein said calibration standard is shielded from contamination
2 by a cover.

1 9. The method of claim 5, wherein contact is maintained between said mock slider and said
2 mock disc by at least one spring.

1 10. The method of claim 5, wherein said gap varies with location.

1 11. The method of claim 10, wherein said gap varies in a manner selected from the group
2 consisting of: linearly, parabolically, curvingly, and concavely.

1 12. The method of claim 5, wherein said optical measurement includes an optical
2 interference measurement.

1 13. The method of claim 12, further comprising:
2 determining an actual gap size between said disc and said inclined surface at one or more
3 locations;

4 determining by optical measurement an observed gap size between said disc and said
5 inclined surface at one or more of said locations; and
6 comparing said observed gap size to said actual gap size at each of said locations.

1 14. The method of claim 13, further comprising:
2 developing a plurality of curves representative of light intensity with respect to location
3 on said inclined surface, each curve associated to a specific light frequency; and
4 for each of a plurality of locations, associating a combination of light intensity values to
5 their respective measured gap size.

1 15. The method of claim 13, further comprising:
2 for each location, comparing the measured gap size to the actual gap size; and
3 calibrating said gap size measuring tool based on the differential between each measured
4 gap size and its associated actual gap size.

1 16. The method of claim 14, further comprising:
2 utilizing the light intensity curves to determine a minimum light intensity and a
3 maximum light intensity.

1 17. The method of claim 16, further comprising:
2 calibrating said gap size measuring tool based on said minimum light intensity and said
3 maximum light intensity.

1 18. A system for calibrating a gap measuring tool comprising:
2 a calibration standard including at least one mock slider to be in contact with a mock
3 disc, said slider including a recessed portion, said recessed portion being a slider surface recessed
4 with respect to a disc surface, wherein
5 an actual distance between said disc and said surface of recessed portion of said slider is
6 determined at at least one location;
7 an observed distance between said disc and said surface of recessed portion of said slider
8 is determined by optical measurement at said at least one of said locations; and
9 said observed distance is compared to said actual distance at each of said locations.

1 19. The system of claim 18, wherein said gap measuring tool is calibrated based on the
2 differential between each measured distance and its associated actual distance.

1 20. The system of claim 18, wherein an irregularity gap between said disc and a top surface
2 of said slider is determined by optical measurement at one or more locations.

1 21. The system of claim 18, wherein said mock slider has an inclined surface, said inclined
2 surface maintaining a space between said disc and said slider varying with respect to position.

1 22. The system of claim 21, wherein said recessed portion of said slider is formed by a
2 chemical deposition process.

- 1 23. The system of claim 21, wherein said actual distance is determined by an atomic force
2 microscope (AFM).
- 1 24. The system of claim 21, wherein said calibration standard is shielded from contamination
2 by a cover.
- 1 25. The system of claim 21, wherein contact is maintained between said mock slider and said
2 mock disc by at least one spring.
- 1 26. The system of claim 21, wherein said gap varies with location.
- 1 27. The system of claim 26, wherein said gap varies in a manner selected from the group
2 consisting of: linearly, parabolically, curvingly, and concavely.
- 1 28. The system of claim 21, wherein said optical measurement includes an optical
2 interference measurement.
- 1 29. The system of claim 28, wherein an actual gap size between said disc and said inclined
2 surface is determined at one or more locations; an observed gap size between said disc and said
3 inclined surface is determined by optical measurement at one or more of said locations; and said
4 observed gap size is compared to said actual gap size at each of said locations.

30. The system of claim 29, wherein a plurality of curves representative of light intensity with respect to location on said inclined surface are developed, each curve associated to a specific light frequency; and
for each of a plurality of locations, a combination of light intensity values is associated to the respective measured gap size.

31. The system of claim 29, wherein for each location, the measured gap size is compared to the actual gap size; and the gap size measuring tool is calibrated based on the differential between each measured gap size and its associated actual gap size.

32. A method for calibrating a gap measuring tool comprising:
providing a calibration standard including at least one mock slider to be in contact with a mock disc, said slider including a mock slider having an inclined surface, said inclined surface maintaining a gap varying with position between said disc and said slider;
determining an actual gap size between said disc and said inclined surface at at least one location;
determining by optical measurement an observed gap size between said disc and said inclined surface at said at least one of said locations;
developing a plurality of curves representative of light intensity with respect to location on said inclined surface, each curve associated to a specific light frequency; and
for each of a plurality of locations, associating a combination of light intensity values to their respective measured gap size.

- 1 33. The method of claim 32, further comprising:
- 2 for each location, comparing the measured gap size to the actual gap size; and
- 3 calibrating said gap size measuring tool based on the differential between each measured
- 4 gap size and its associated actual gap size.